

Introductions for Biological Control in Hawaii 1981 and 1982

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The Plant Pest Control Branch of the Hawaii Department of Agriculture has maintained a beneficial organism introduction program for many years. This paper provides notes on the status of some pests and their purposely introduced natural enemies and a list of insects introduced and released for biological control during 1981 and 1982 (Table 1). All beneficial introductions are thoroughly screened and studied in a quarantine facility and must go through a clearance procedure prior to being released.

INSECT PEST CONTROL

Aleurodicus dispersus Russell (spiraling whitefly)

Four of the five beneficial insects released during 1979 and 1980 have become well established and have contributed in suppressing *A. dispersus* populations on all islands. The aphelinid, *Encarsia ?hawaiiensis* Dozier, and the coccinellid, *Nephaspis amnicola* Wingo, were commonly encountered amid light, localized spiraling whitefly infestations on all islands whereas two other coccinellids, *Delphastus pusillus* (LeConte) and *Nephaspis bicolor* Gordon, were not as common. *N. bicolor*, described recently by Gordon (1982), was previously reported as an undescribed species of *Nephaspis* (Lai et al. 1982).

Aleurothrixus floccosus (Maskell) (woolly whitefly)

The woolly whitefly was discovered at Halawa Heights in March 1981 and quickly dispersed throughout the island of Oahu. Infestations were heaviest on citrus, guava and plumeria. The woolly whitefly subsequently was found on Molokai and Lanai during 1982. A platygasterid, *Amitis ?spiniferus* (Brethes), and an aphelinid, *Cales noacki* DeSantis, were released in October and December 1981, respectively, to aid in the control of *A. floccosus*. Although both species became established, *C. noacki* played a more significant role in reducing *A. floccosus* infestations on Oahu. An undescribed species of *Eretmocerus* (Aphelinidae) was also found to be parasitizing *A. floccosus* on Oahu during 1982. Releases of these beneficial insects are continuing on Molokai and Lanai.

Carpophilus hemipterus (L.) and *C. humeralis* (Fab.) (pineapple souring beetles)

Propagation of the staphylinid, *Philothalpus analis* Erichson, was terminated in June 1981 as there was no indication of its establishment after being released on the islands of Maui, Oahu, and Lanai for the past five years.

An encyrtid, *Zeteticontus utilis* Noyes, was instead propagated and released on Maui during August 1981 to aid in the control of *C. hemipterus* and *C. humeralis*. It was recovered from several release sites on Maui in late 1982. *Z. utilis*, previously reported as an undescribed species of *Zeteticontus* (Lai et al. 1982), was described recently by Noyes (1982).

Liriomyza spp. (leafminers)

Five species of leafminer parasites were imported through the exploratory program during 1981 and 1982. Although four of the five imported species were known to be established in Hawaii, propagation and liberations of these parasites were

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TABLE 1. Introductions for Biological Control in Hawaii: 1981-1982.

Pest	Organism Introduced	Source	Sender	Date of Initial Release	No. Released 1981-1982	Release Site
<i>Aleurothrix floccosus</i> (Maskell) (woolly whitefly)	<i>Amitus ?spiniferus</i> (Brethes) (Hymenoptera: Platygasteridae)	San Ysidro, Calif.	R. Burkhart	October 1981	30	Oahu
	<i>Cales noacki</i> DeSantis (Hymenoptera: Aphelinidae)	UC, Riverside, Calif.	M. Rose	December 1981	102,500	Oahu, Molokai, Lanai
<i>Carpophilus hemipterus</i> (L.) & <i>Carpophilus humeralis</i> (F.) (pineapple souring beetles)	<i>Zeteticontus utilis</i> Noyes (Hymenoptera: Encyrtidae)	Thika, Kenya	K. Murai & R. Heu	August 1981	105,000	Maui
<i>Haematobia irritans</i> (L.) (horn fly)	* <i>Euoniticellus intermedius</i> Reiche (Coleoptera: Scarabaeidae)	CSIRO, Australia	M. Wallace	October 1982	565	Hawaii
<i>Kelferia lycopersicella</i> (Walsingham) (tomato pinworm)	** <i>Apanteles dignus</i> Muesebeck (Hymenoptera: Braconidae)	San Diego, Calif.	R. Burkhart	January 1982	640	Oahu, Maui
	** <i>Apanteles scutellaris</i> Muesebeck (Hymenoptera: Braconidae)	San Diego, Calif.	R. Burkhart	October 1981	514	Oahu, Maui
	* <i>Sympiesis stigmatipennis</i> Girault (Hymenoptera: Eulophidae)	San Diego, Calif.	R. Burkhart	February 1982	30	Maui
<i>Liriomyza</i> spp. (leafminers)	** <i>Chrysocharis parksi</i> Crawford (Hymenoptera: Eulophidae)	Oceanside, Calif.	R. Burkhart	November 1981	20,100	Oahu, Maui, Hawaii

	**Chrysonotomya punctiventris (Crawford) (Hymenoptera: Eulophidae)	Oceanside, Calif.	R. Burkhart	August 1982	1,300	Oahu, Maui
	<i>Diaulinopsis callichroma</i> (Crawford) (Hymenoptera: Eulophidae)	Trinidad, W. Indies	R. Burkhart	May 1981	200	Oahu
	**Halticoptera patellana (Dalman) (Hymenoptera: Pteromalidae)	Oceanside, Calif.	R. Burkhart	May 1982	6,000	Oahu, Maui Hawaii
	**Opis dissitus Muesebeck (Hymenoptera: Braconidae)	Gainesville, Florida	R. Burkhart	December 1981	4,100	Oahu, Maui, Hawaii
<i>Salsolar pestifer</i> A. Nelson (Russian thistle)	*Coleophora klimeschiella Toll (Lepidoptera: Coleophoridae)	USDA, Albany, Calif.	A. Kreuger	August 1981	160	Hawaii
<i>Tetranychus cinnabarinus</i> (Boisduval) (carmine spider mite)	<i>Amblyseius longispinosus</i> (Evans) (Parasitiformes: Phytoseiidae)	San Juan, Puerto Rico	R. Burkhart	February 1982	62,500	Oahu, Maui, Hawaii
	**Phytoseiulus macropilus Banks (Parasitiformes: Phytoseiidae)	San Juan, Puerto Rico	R. Burkhart	February 1982	88,000	Oahu, Maui, Molokai, Hawaii
	<i>Scolothrips sexmaculatus</i> (Pergande) (Thysanoptera: Thripidae)	Virgin Islands, Florida, Puerto Rico	R. Burkhart	September 1982	3,000	Oahu
	**Typhlodromus (=Metaseiulus) <i>occidentalis</i> Nesbitt (Parasitiformes: Phytoseiidae)	UC, Berkeley, Calif.	M. Hoy	April 1982	11,650	Oahu, Maui Hawaii

*Reintroduction of species previously introduced and released but not found to be established.

**Reintroduction of an established species.

carried out to boost field populations in farm areas where *Liriomyza* spp. were a problem. Cultures of *Diaulinopsis callichroma* (Crawford) (Eulophidae), the only "new" species introduced during this period, died out after one release of 200 adults at Lualualei, Oahu.

Plutella xylostella (L.) (diamondback moth)

The diamondback moth continued to cause damage to cabbages on Maui during 1981 and 1982. It became a serious pest of watercress on Oahu in 1982. Propagation of the braconid, *Apanteles plutellae* Kurdjumov, was expanded in 1982 to include the Honolulu insectary on Oahu, as well as the Kahului insectary on Maui. Liberations of *A. plutellae* were made in cabbage fields on Maui and watercress fields on Oahu. Establishment of *A. plutellae* was achieved during 1982.

Tetranychus cinnabarinus (Boisduval) (carmine spider mite)

The sixspotted thrips, *Scolothrips sexmaculatus* (Pergande), a predator of spider mites, was liberated in non-cultivated areas adjacent to commercial farms in Waianae and Pearl City on Oahu during September 1982. Based on laboratory studies, *S. sexmaculatus* appears to possess desirable attributes of an effective predator, such as high fecundity, voraciousness, and specificity to spider mites (R. Heu, pers. comm.).

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